of pumps to consist of three, arranged to deliver uniform flow into main, and exert uniform strain on machinery. The gearing to admit of working separately or together, and each wheel to drive either set of pumps, or both, so that part of the pumps may be disconnected for repairs, and the remainder worked independently, if necessary. The machinery to be governed by a self-acting regulator, to maintain suitable pressure for domestic or fire purposes, and change one for the other as required.

The Turbines to be of simple and durable construction, provided with iron trunks and casings, draft tubes, gates, &c., arranged to have working pacts accessible above back water, and take advantage of fluctuations of head and tail water within ordinary limits. The capacity and strength of the Machinery to be such that the full required quantity to meet any fire emergency may be supplied without increasing the speed beyond a perfectly safe limit.

The Regulator proposed is the Holly Hydrostatic Pressure Regulator, in use in Ogdensburg and elsewhere.

In adopting two sets of reciprocating pumps instead of the three under the rotary system (one of the latter being called the domestic pump,) it is desirable that either of these two sets should have capacity to meet the emergency of ordinary fires, having the other in reserve. In this case all that is needed will be to increase the speed of the working pumps on the first fire-signal, and the risk attendant on starting the second set in hurry or excitement is avoided. To start hurriedly a second powerful set of machinery to work into a main already under high pressure, is accompanied with more risk to both machinery and main, and more loss of valuable minutes, than merely to increase the speed of that already in motion—and requires judgment and caution ; and, as a man may be called upon to do this when roused from a sound sleep, and but half awake, it is desirable to avoid it as far as possible.

The pumping main is short, and a considerable proportion of the cost, especially where in rock excavation, is in the laying, so that the cost is not seriously increased by a small addition to the diameter. Moreover, as it really costs no more to drive large pumps by water-power than small ones, and a small increase in their diameter as well as enlargement of the other working parts does not materially affect the cost, except in the quantity of metal, I consider the true policy is to give liberal dimensions to the